

What is claimed is:

1. A curve production system, comprising:

a flexible handheld tape device comprising a flexible tape  
having relative position sensing elements spaced along the tape, and  
producing relative tape positions relative to a reference position sensing  
element of the tape; and

a curve generation system producing a smooth tape curve  
using the relative positions as positions of the tape curve.

2. A system as recited in claim 1, wherein tape shape is  
dynamically adjustable and curve shape corresponds to the tape shape.

3. A system as recited in claim 2, wherein the curve is part  
of a surface and a shape of the surface corresponds to the curve shape.

4. A system as recited in claim 1, wherein a scene includes  
an anchor curve and the tape curve drags out a surface shape from the  
anchor curve responsive to movement of the flexible tape.

5. A system as recited in claim 4, wherein the surface is  
created by interpolation between the anchor curve and the tape curve.

6. A system as recited in claim 1, wherein the tape curve sets  
an object profile curve.

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7. A system as recited in claim 6, wherein the tape curve provides a path to drag out an object shape along the profile curve.

8. A system as recited in claim 1, wherein the tape curve sets a path curve.

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9. A system as recited in claim 8, wherein the tape curve specifies a surface shape along the path curve.

10. A system as recited in claim 1, wherein the flexible curve provides a profile and an object is created by revolving the profile curve in a scene.

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11. A system as recited in claim 1, wherein the tape curve is a spline curve and the relative tape positions are used as control points of the tape curve.

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12. A system as recited in claim 1, further comprising a world position sensor attached to the flexible tape and providing a three dimensional world position of the tape and said curve generation system positions the tape curve in a virtual scene in correspondence to the world position.

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13. A system as recited in claim 12, wherein said world position sensor senses three dimensional world orientation of said world sensor and said curve generation system positions the tape curve in a virtual scene in correspondence to the world orientation.

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14. A system as recited in claim 1, further comprising a command input device producing an input command and said curve generation system controls the tape curve responsive to the input command.

15. A system as recited in claim 14, wherein said command input device comprises one of a foot pedal, a foot mouse, buttons on a position locator and a portion of the flexible tape.

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16. A system, comprising:  
a flexible handheld tape device comprising a flexible tape having relative position sensing elements spaced along the tape and

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an animation system using the relative positions as a command.

18. A system as recited in claim 16, wherein an end portion tape is used for input command gestures.

20. A system as recited in claim 16, wherein an end portion tape is used for a selection control command.

22. A system, comprising  
a flexible handheld tape device comprising a flexible tape  
e position sensing elements spaced along the tape and  
ative tape positions relative to a reference position sensing

23. A system as recited in claim 22, wherein a virtual scene  
ne curve and said curve generation system edits the scene  
ive to the tape curve.

25. A system as recited in claim 24, wherein the flexible tape has sensors and the wire curve is twisted in correspondence to the twist of the flexible tape.

26. A system as recited in claim 22, wherein a scene includes a wire curve and a wire reference curve and the tape curve controls the wire curve and the wire reference curve.

27. A system as recited in claim 22, wherein a scene include a scene curve and the scene curve is snapped to a shape of the tape curve.

28. A system as recited in claim 1, wherein said curve generation system comprises a user controllable gain controlling relative positions of the tape curve responsive the relative positions of the flexible tape.

29. A system as recited in claim 1, wherein said tape curve is displayed egocentrically to the user in a scene in which the tape curve is interacting within changes in viewpoint.

30. A system as recited in claim 1, wherein the flexible tape comprises a physical constraint comprising one of a substitutable mechanical stiffness member, a physical position lock and a shape retaining member.

31. A system as recited in claim 1, wherein the tape curve dynamically controls curves in a dynamic scene responsive to the flexible tape.

32. A system as recited in claim 1, wherein the flexible tape is conformed to a shape of a physical object and the tape curve comprises an input of the shape.

33. A system as recited in claim 1, wherein said device includes subsection specification sensors and said tape curve shape is responsive to subsection shape.

34. A system as recited in claim 1, further comprising:  
a two-dimensional surface upon which said device rests and upon which surface a shape of said device is changed; and

a world position input device specifying a world position of the tape curve.

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35. A curve production system, comprising:

a flexible handheld tape device comprising a dynamically shape adjustable flexible tape having relative position sensing elements spaced along the tape and producing relative tape positions relative to a reference position sensing element of the tape;

a curve generation and editing system producing a smooth spline tape curve using the relative positions as positions of the tape curve corresponding to the dynamically adjusted shape and producing a shape of a surface when the tape curve drags out a surface shape from an anchor curve responsive to movement of the flexible tape; and

a world position sensor attached to the flexible tape and providing a three dimensional world position and orientation of the tape and said curve generation system positioning the tape curve in a virtual scene in correspondence to the world position and orientation; and

with said tape device acting as command input device producing an input command and said curve generation system controlling and editing the tape curve responsive to the input command and a shape of the tape curve.

36. A curve production system, comprising:

a flexible tape device producing shape, twist and six degrees of freedom position information; and

display means displaying a virtual curve having a shape, a twist and a position corresponding to the shape, twist and six degrees of freedom position information.

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37. A curve production method, comprising:  
adjusting a shape of a flexible tape; and  
producing a virtual curve using the flexible tape as control  
points of a non-uniform rational B-spline curve.

38. A computer readable storage controlling a computer and  
comprising a process of inputting a shape of a flexible tape and controlling  
a non-uniform rational B-spline curve responsive to the shape.

39. A graphical user interface comprising a virtual non-  
uniform rational B-spline tape curve manipulable in a scene responsive to a  
physical flexible tape.

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